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Interaction and social learning : keys in distance education

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Abstract
While distance learning is now becoming a norm, instructional designers and distance educators alike need to relook at how instruction is occurring in the online environment to ensure interaction is present. This literature review shows how distance learning has evolved through the use of an ever-changing facilitator, namely technology. The review explores interaction and the role it plays in the learning process. Social learning stresses that learners need to interact in order to build their knowledge and since technology-enhanced worlds hinder face-to-face interaction, distance educators and designers can address these shortcomings by designing interactive and collaborative environments. In conclusion, taking advantage of technology-savvy learners and the available technology, educators can design courses that would maximize interaction. Instructional design enabling interactive and collaborative environments inherently promotes social learning and greater learner achievement levels.

INTERACTION AND SOCIAL LEARNING:

KEYS IN DISTANCE EDUCATION

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ABSTRACT

While distance learning is now becoming a norm, instructional designers and distance educators alike need to relook at how instruction is occurring in the online environment to ensure interaction is present. This literature review shows how distance learning has evolved through the use of an ever-changing facilitator, namely technology. The review explores interaction and the role it plays in the learning process. Social learning stresses that learners need to interact in order to build their knowledge and since technology-enhanced worlds hinder face-to-face interaction, distance educators and designers can address these shortcomings by designing interactive and collaborative environments. In conclusion, taking advantage of technology-savvy learners and the available technology, educators can design courses that would maximize interaction. Instructional design enabling interactive and collaborative environments inherently promotes social learning and greater learner achievement levels.

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INTRODUCTION

No one can foresee how learning will transpire in the future but if an individual were to look at the past, he or she must imagine a different environment than what exists today. Since institutionally-based education has long been for learners who met certain limiting criteria, distance education rose to serve a wider audience (Simonson, Smaldino, Albright, & Zvacek, 2003). Historically the educational field has been transformed through the progression and facilitation of technology. The evolution of distance learning has been significant, as prior to the 18th century technologies used to assist educators in their classrooms were limited to the traditional chalk and board (Cuban, 2001).

The earliest introduction of distance learning can be traced to mail or correspondence courses used to reach learners as early as the beginning of the 18th century. It was not until the early 20th century that distance education was redefined and correspondence courses were successively followed by the use of radio, television, and the computer based courses (Cuban, 2001). The introduction of high-speed broadband, faster personal computers, and the Internet in the latter part of the 20th century has moved the educational field into an online world. With technologies continuously upgrading, inevitably an individual can imagine a virtual world, one complete with activities, acquaintances, jobs, hobbies and learning (Comeaux, 2005).

Envisioning an online interactive learning environment is realistic with today's peer-to-peer networks, learning communities, online sites for many types of hobbies or professions, and social networking sites (Tu, 2002). Individuals have access to even the basic necessities online, and can accomplish essentials such as shopping for groceries, clothing, and home items from their laptops or desktop computers. In essence

communities have been formed online and educators must take advantage of the medium and those communities if they are to effectively engage in distance education. Since education strives to prepare active citizens, distance learning must also prepare learners for a life in society (Comeaux, 2002).

The virtual community, for the purpose of this literature review, is defined as any social engagement and centralized location on the web where society and learners gather to socialize and interact. Just as face-to-face education incorporates aspects of communities, so do educators need to realize that in order to reach learners in the virtual community, educators and instructional designers need to have access to technology and understand the online environment (Cuban, 1986). They must also recognize that online environments support all activities encompassing the daily lives of the learners. With that in mind they must tailor their courses in such a manner that educators will be able to captivate their audience and succeed in their mission to educate.

Educators have pursued various approaches to tailor distance learning to the learners' needs but the emphasis on interaction needs to be defined and included as a key component to online instructional design (Wells, 1999). Social (collaborative) learning theory discusses the relevance of interaction in learning. As the practice of collaborative learning has been traced to our earliest ancestors, its emphasis on interaction makes it pertinent in today's virtual communities. Interaction and social learning should be emphasized to sustain the educational system as well as how we learn in society (Vygostky, 1978). Ensuring the core principles of effective interactive and collaborative learning enables higher achievement levels amongst learners and strengthens civilization (Dede, 1990).

This literature review is significant because virtual communities are becoming integral in today's society and education must play a key role in teaching the norms that persist in face-to-face interactions in the virtual world (Wilson 1996). Understanding these new communities and how they interact may mean developing courses tailored to the online world, as well as understanding learners and how they best interact in the technology-enhanced environment (Childers & Berner, 2000). The significance of the online communities and society must be understood if educators are to be successful in educating the present and future distant learner.

This literature review focuses on providing an overview of how technology has assisted distance learning, and answering the following questions:

What is distance education?

What does it take to shift to a distance education format?

How does interaction occur in distance learning?

How does it all tie in to the learner enhancing his or her knowledge in an online learning environment?

One must understand that essential to designing and teaching online courses are interaction and collaborative learning, key components of learning. Ensuring interaction and collaboration occur ensures sustainment of society's norms of communication and socializing (Wells, 1999).

METHODOLOGY

This literature review evaluates journal articles and published works addressing technology, interaction, and social learning as they relate to distance education. As a starting point, the works by Bandura (1971), Vygotsky (1978), Smaldino, Lowther, and Russell (2008), and Wanstreet (2006) were assessed to determine the key authors and terminology of the field. They were supplemented by known works by the author. The years chosen for the study were from the early 1970s to recent works. The earlier works were needed to support the key theories relating to social learning and interaction as well as the history of distance learning.

The University of Northern Iowa library and its staff were helpful in identifying terminology and definitions. The EBSChost, Academic OneFile, CQ Researcher, and UNISTAR database searches were conducted for journal articles and books encompassing the key terminology. Key terms used included *distance education, interaction, social learning, collaborative learning,* and *technology*. The rationale for choosing these databases, keywords, and the results was that they provide the literature that is available to those directly involved in the field of distance learning.

The procedure used in analyzing the literature was to identify authors and journals prominent in discussions of distance education and/or interaction. These were chosen for analysis because they were cited in other credible works. Evaluation of literature reviewed and selected was conducted by verifying if key theories and concepts were covered. One limitation to this approach was the restraint for literature relating to social learning. While there may be other approaches to distance learning, the emphasis and therefore literature chosen reflect positively on the topic.

ANALYSIS AND DISCUSSION

The literature reviewed will encompass findings on how technology has been integrated into educational use and serves as a facilitating tool, how over time distance learning has become a more prominent venue for learners, and how enabling interactive and social learning enables online learning which in turn means greater success in student performance and achievement levels. The review will document the relevance of interaction and underscore why it's a necessary component to learning.

History of Technology in Education

The continuous shift to distance learning has not only been exacerbated by the typical reasons: accessibility, availability, affordability, but also by technology advancements and most recently by budget constraints (Cuban, 2001). Educators time and again have had a need for tools to assist them, and have never shied away from technology, often using them as tools to facilitate the learning process. Whenever a new technology became widely used by society, the educational field incorporated the technology into curricula and school use (McIssac & Gunawardema, 1996). Although the adoption and adaptation of technology is often delayed until it has become part of mainstream society, technology has often made education to be more readily available to learners, regardless of their geographical location.

As technology is incorporated into mainstream society, educators and instructional designers have found ways in which to adapt and use it to facilitate learning (Cuban, 1986). Technology in education can be traced back to the introduction of print technology which to this day enables wider and cheaper dissemination of learning materials. Printing presses enabled correspondence courses to be more practical. Learners

received printed educational materials through the mail, studied on their own, and returned their work to a centralized location that gauged their performance. Radio technology brought about audio dissemination of courses but such a technology was limited to a one way communication. Television added a visual medium to educating with live televised education and video recorded educational programs. Computers extended the delivery by making the learning interactive with computer-assisted training and learning. Lastly, the introduction of the Internet brought about online institutions and online learning. In each instance educators have adapted the technology as a tool/facilitator of the learning process (Cuban, 2001).

With the advent of high-speed Internet connections, computers processing information at super-fast speeds and the introduction of wireless technology, constant change and adaptation have become norms, not only in society, but also in the educational field. Whereas education has been centralized, technologies such as the web, teleconferencing, and live streams allow education to be decentralized. Whereas learning has been limited to local libraries and fellow students in a physical location, today's classroom has direct access to unlimited information and can have learners dispersed, unlimited by their physical locations. Newer technologies are key to making distance and communication barriers non-issues, and are pushing the limits to what a student can do with technology to garner the knowledge he or she needs to be successful (Reiser & Dempsey, 2002).

Educational institutions already offering distance education cite an increase of student access to technology as integral to their overall education plans (U.S. Department of Education, 2003). It is then inevitable that as newer technologies become available to

society, institutions will integrate them into their learning plans and that distance learning mediums will continue to change the educational system. In turn, learning and teaching have been, are, and will continue to be challenged and changed by distance education (Simonson et al., 2003). Technology-based innovations introduced and used by society will inevitably continue to play a role in the education of future students.

Distance Education

Government policies promoting education for all citizens and ongoing efforts by the educational system to address those policies has meant educational institutions have and will strive to accommodate and compensate for the many limitations and barriers learners experience (Miller, 2009). Limitations such as location, affordability, and accessibility have long limited wider dissemination of education; learners who were unable to relocate, afford, or have the means to access education were left behind or were limited in achieving their educational goals. Conceivably, the educational system cannot impact limitations affecting the individual learner but it can affect those of the institution. In that sense, centralized locations meant learners in standing occupations were hampered in their ability to enroll and physically move to a learning institution. This constraint made education almost private to those who can travel to the location, afford it, and/or have access to the educational system (Comeaux, 2005).

In addressing these limitations, educational institutions have used many tools and avenues to provide alternative forms of education. These shortcomings, along with the introduction of technology, enabled a new form of learning: distance learning. The concept of educating learners at a distance is not a new notion as indicated by the literature reviewed thus far. Distance learning, however, has rapidly evolved throughout

the last century through radio, video, television, and personal computer technology (Cuban, 2001). Moreover, technology innovation is occurring at an even faster pace in today's world, making distance learning better suited for learning.

Even the type of learner has changed over time. In the latter part of the 18th and 19th centuries, correspondence courses were for the wealthy and already educated. The 20th century saw wider availability of education and distance learners became those who were seeking further training, otherwise referred to as non-traditional students. Non-traditional distance learners represented those individuals working, caring for family, or unable to physically attend school (Gibson, 1998). Today's distant learner, however, consists of any student regardless of the limitations that have prevented learners in the past. Even learners enrolled and attending schooling at an institution may be required to enroll, or are enrolled in distance learning courses (DeTure, 2004).

Such a remarkable shift has been due to the push to provide an education to every citizen. Higher learning institutions have been major players in shifting courses, programs, and schools online. The Department of Education's recent study found that of the 11,200 college level programs at degree-granting post-secondary institutions, 66 percent of undergraduate, and 60 percent of graduate courses were offered in some form of distance learning. The hybrid courses saw the most significant growth with two thirds (66%) of all distance learning courses being offered using a combination of synchronous and asynchronous technologies (U.S. Department of Education, 2009).

An increase in course availability also meant an increase in enrollment. In the 2009 report the U.S. Department of Education reported an estimated:

> . . . 12.2 million enrollments (or registrations) in college-level credit-granting distance education courses. Of these distance education enrollments, 77 percent were reported in online courses, 12 percent were reported in hybrid/blended online courses and 10 percent were reported in other types of distance education courses. (p. 3)

Although these numbers reflect a rapid growth in distance learning offered by the educational field, the numbers don't necessarily mean the educational system is the forerunner in integrating technologies to facilitate their endeavors. Both the private sector and the U.S. military have led the way, mostly for the sake of efficiency and as cost-cutting methods (Reiser & Dempsey, 2002). It is relatively inexpensive to have employees complete distance learning training from their workplaces rather than paying for their travel, the cost of the course, and time away from work. Predictably, organizations without the funds to spend or internal means (technology) to use, tend to provide more external distance learning avenues to employees.

The U.S. military considers distance education a cost-effective method to deliver technical and tactical training to students wherever they may be based. They use a combination of interactive technologies primarily using the Internet or broadband networks to achieve learning that was once institutionally place-based. Interactive networks are designed for simulators that learners can use from virtually anywhere in the world and day-to-day scenarios are conducted in a virtual world by learners from various organizations (Simonson et al., 2003). The military also provides numerous virtual online resources to their personnel. Each soldier has a personalized webpage on Army Knowledge Online (AKO) designed to tailor their learning needs. Soldiers have access to

and are able to enroll in almost any type of distance learning training through the use of online-based software such as Rosetta, Adobe Connect, and Java-based applications (Comeaux, 2005).

With the advent of increasingly sophisticated digitized operations, the military is constantly striving to identify training strategies to maximize skill acquisition, retention, and utilizations. These training needs often go beyond institution-based courses as skills that are required can only be obtained from more realistic training. Virtual environments now encompass training for almost any field, including but not limited to pilot, mariner, and driving. Even technologists receive their training in virtual environments. In each instance, the learner gets the opportunity to get as realistic training as possible and gets to interact with the application and material (Reiser & Dempsey, 2002). The U.S. military's ambitious move towards distance learning has made it a leader in providing distance learning to its employees, but may reflect a trend that other organizations and the educational system may pursue.

Shifting to Distance Education

The U.S. Department of Education has strived to research distance learning and how technology has impacted the delivery method, instruction, and learning at all levels (elementary, secondary, and postsecondary) (U.S. Department of Education, 2009). The research data has been and continues to be used to inform educators of the relevance of technology through the form of assessments and statistics, as well as recommendations. The government's research shows how postsecondary education in particular has shifted more and more to distance learning. Whereas in 2000-01 (U.S. Department of Education,

2003), slightly over half of universities offered online courses, in 2006-07 this number increased to two-thirds (66 percent) (U.S. Department of Education, 2009).

The reasons for shifting to distance learning in higher learning largely reflect the policies of the wider availability of education. Making education more affordable and making more courses available through distance learning has meant institutions have experienced an increase in enrollment (Miller, 2009). The online flexibility the institutions have provided has meant that even employed learners can enroll in programs. Such reasons will not lose significance in any foreseeable future, which means that the progressive shift to distance learning will continue (Reiser & Dempsey, 2002).

The shift to the virtual world for learners and institutions will progressively continue, especially as technologies become more advanced, more affordable, and can meet the demands of the educational system (Moore, 2001). The rapid advancement in technologies can be seen daily with every new version of software or new cell phone that can do significantly more tasks than its predecessors. A walk through any campus at any level of learning can easily depict how learners have become attached to some form of technology and how at times they are living and socializing both in the real and virtual worlds. Even classrooms are changing with fewer and fewer educators using the traditional chalkboard and relying more on presentations, videos, and online sources. The virtual world has and will continue to impact both distance learning and traditional classroom modes of learning (Comeaux, 2005).

This paradigm shift will continue and so the concern for educators has to be that people must effectively communicate and socialize with each other in the digital world. The learning that occurs through social interaction must be incorporated into the digital

world so that we don't lose the valuable component of learning (Mercer, 2000). The constructivist and social learning theorists have long emphasized the significance of interaction and collaboration as a necessity to learning (Gagne, 1974). These theories are relevant as society continues to move to the cyber-world. Understanding these theories can reduce concerns about social interaction not becoming less evident in distance learning.

Technology is in fact only a tool and medium, and when used effectively, can contribute to learning (Jonassen, Howland, Moore, & Marra, 2003). Using the theory that states social interaction is a key component to learning then leads to understanding why it is necessary to tailor distance learning so that courses that are online-based would maintain the necessary components of learning that our society has used throughout its history (Gagne, 1985). The importance of social learning then takes precedence and this literature review will address its significance as it relates to distance (online) learning.

Interaction

Traditionally, interaction is defined as the process of relating to one another, be it between a student and teacher, student to student, or student with the environment (Moore, 1989). Learners interact with the teacher to get instruction or guidance, with each other by addressing topics of discussion, or with their environment such as reading a textbook for class. While interaction is present in learning environments, even in courses that have not considered it in-depth in curriculum development, it is critical to the process of learning as this is how learners assimilate facts, opinions, and truths to achieve learning (Duffy & Jonassen, 1992).

In distance learning, interaction has been defined in various ways and at times it has been challenging to pin down the specifics of interaction (Moore, 1989). Although there has been general consensus amongst distance learning researchers and educators that interaction is as key a variable in distance learning as it is in traditional learning, interaction has often been defined by instruction, communication, and social learning. These variations in the definition emphasize separate aspects of online learning and distinguish interaction, not as something occurring in the entire learning process, but rather happening only in specific instances (Fulford & Zhang, 1993).

The definition of interaction takes on further meaning when interaction is considered in technology-supported environments, both in the educational field and in society. Online sites offer varying degrees of interaction. Media outlets that typically offer face-to-face interaction now are tailored and personalized to virtual users. Instead of receiving a newspaper at one's doorstep, it is now possible to get an electronic version to read on laptops, blackberries, or cellular telephones. Interactive entertainment is now the key phrase amongst software developers, the entertainment industry, and any smart businessman or educator. The more interactive the technology, the greater the audience, so developers continuously strive to push the limits and keep on adding functions to remain competitive (Miller, 2009).

The virtual world has become an interactive environment full of entertainment, ecommerce, work, leisure, and educational venues. Each area seeks to attract customers, clients, and users by catering to their needs using the latest technologies. The virtual environment in essence has become the community where individuals interact with each

other. Interaction merely has shifted to the virtual world and continues to exist (Tu, 2002).

What were once face-to-face meetings, social functions, and courses now exist in a different environment - one that is mobile and with users who engage unhindered by locality. Mobile technology takes interaction even further as, no longer does a user in a different geographical location have to stay in front of the computer. They can now interact within their virtual community by the use of cellular phones that have access to chat, mail, Internet, and video. In professional settings, videoconferencing and software such as Adobe Connect enable a user to be present in meetings, conferences, presentations, and courses simultaneously (Miller, 2009). Interactive communications have shifted to the virtual world and educators must value its significance because interaction, while present, occurs to varying degrees from user/learner to user/learner. Such interaction largely depends on technology; however, there are many issues and limitations (Holmberg, 1989).

Interaction as Relevant to Learning

The world of learning is based upon various psychological theories that attempt to describe and understand human behavior. Most psychological theories describe learning as "a persisting change in human performance or performance potential" (Driscoll, 1994, p. 11), and emphasize that learning is a direct result of the "learner's experience and interaction with the world" (p. 11). This delineates any experience and interaction in people's daily lives as learning. More importantly it highlights interaction as a significant component of the learning process enabling the opportunity for learners to change or increase in potential.

Using these theories as the premise for our discussion, then it follows that learning occurs in the classroom as well as outside. This premise is important to consider in order to be able to understand how interaction is relevant to distance learning. The notion of traditional distant learners is no longer understood as students sitting in a classroom (traditional setting) or in front of a computer. More students are interacting with their environment as they take online courses and take advantage of technologies to facilitate their resource finding and development of ideas (Wells, 1999). From the educator's standpoint this notion is an asset, as their design of courses and/or instruction can incorporate the students' environment into the learning, taking advantage of the tool (technology) to facilitate the learning.

Throughout human existence, communication has distinguished our mental abilities from those of any other creature. Human communication has been the primary mode to relay ideas, thoughts, and opinions to each other. From non-verbal (signs) to verbal and written communication, humans have interacted and as a species have advanced cognitively (Comeaux, 2002). Throughout human history, tools (signs, speech, writing, pictures, computers) have been used to communicate. Communicating with each other enabled humans to understand and master their world. It also enabled them to survive because they socialized by communicating and working collaboratively with each other. In essence society advanced by humans working together, as part of a community, with individual humans not able to survive on their own (Mercer, 2000).

Learning also is a key component to the evolution of mankind. Historians trace the development of mankind by landmarks in learning achievements. Starting from the first crude tools, to the industrial revolution, to today's technology age, humans have

survived by learning and adapting. Inevitably theorists like Bandura (1971), Piaget, Grize, Szeminska, and Bang, (1977), and Vygotsky (1978) came to the conclusion that collaborative or social learning was a key component to learning. Learning best transpires through learners interacting with each other and the environment, and deriving their knowledge from this process. Even though behaviorists and constructivists are not the sole education psychology theorists that believe or understand the significance of interaction, their terminology of collaborative learning best exemplifies what is important. Interaction, social in particular, is an essential component of the learning process. Understanding such a notion may help educators prepare more effective distance learning courses (Wells, 1999).

Interaction and Learning

Learning transpires whenever individuals interact with their environment, be it in a classroom, with classmates while doing a project, at home interacting with family, or in any environment that may be new to the learner (Bandura, 1971). Whenever the learners acquaint themselves with new facts, principles, or truths, they gain in knowledge. Each experience, both inside and outside of the classroom, builds upon the formal and informal knowledge base. Education, the formal method of learning, has traditionally focused on providing knowledge in a formal setting with the assistance of educators and their tools. The interaction or communication serves as the tool used in the process of learning. Thinking, socializing, and understanding everything about our environment only comes when the learner is immersed in a new fact, principle, or truth (Comeaux, 2002).

Not all educational psychological theories place a high value on interaction, but all stress it must be present in the learning process. For the purpose of studying

interaction, one only needs to take a look at social learning and constructivist or social constructivist theories. Bandura (1971) and social learning theorists base their work on the principle of collaboration amongst learners who actively and collectively seek to improve their learning. In essence, they are saying that each experience and each learner is important to the learning process. Piaget and constructivist theorists valued the essence of play (learners interacting informally) as important to the learner's cognitive development (Wilson, 1996). Constructivist theorists advance this by noting that learners construct and develop their knowledge directly from their experiences.

Social constructivist theory also combines the collaborative aspect of constructivists with the social emphasis of social learning. It emphasizes that the building of knowledge occurs within the context of society and learners depend on their neighbors, peers, teacher, technology, and overall environment as an information source. The learner adapts and assimilates the information constructing their knowledge (Bruning, Schraw, & Ronning, 1999). The theory stresses learning occurs at all times, within the classroom and outside it, and that it does not only take place inside our minds, but also whenever learners are engaged and interaction is occurring in society (Vygotsky, 1978). Combined, these learning theories underscore the relevance of the social context in learning. Knowledge building or constructing has to occur at all times and in formal and informal settings.

Aside from these theories, the educational field regards interaction and collaboration as components of overall learning (Tu, 2002). More importantly educators cite interaction and collaborative learning as vital elements in the educational process (Comeaux, 2005; Simonson et al., 2003). Educators are known to incorporate learning

activities in coursework that require some form of interaction amongst learners. This often comes in the form of discussion, a presentation, a project, or a group paper whereby students must collaboratively accomplish an assignment. The end goal is the required assignment, but what learners accomplish through such collaborative activities is the formulation of knowledge as they work and share with their peers. As learning is continuous, social learning comprises a significant portion of the learning as students also seek feedback and learn from each other beyond the classroom (Childers & Berner, 2000).

Educational theorists differ on the extent or importance of social learning in the learning process. Inevitably theories focus on varying aspects of learning because they see their areas of emphasis as vital to learning. Social or collaborative learning may not necessarily be the approach used in every instance as content and types of learners and their methods of learning may also play a role (Gibson, 1998). The saying *no two learners are alike* is perhaps what makes an approach or theory of learning completely valid, so the emphasis should be on how to use individual learner traits within the educational setting. Collaborative and/or social learning is an effective approach as every educator may define learning with varying aspects, but they all share and cite interaction and collaborative learning as vital elements in the educational process (Comeaux, 2002; Palloff & Pratt, 1999). Educators contend that without effective communication and interaction between the student, teacher, and the environment, learning is severely affected, and in some instances fails to occur (Nystrand, 1997).

Although psychological educational theories are distinguishable from one another by their focus area or the exact nature of learning, they do share common themes. The

most significant to educators is that the learning process, how and when students acquire and process information, consists of the learner receiving instruction from the educator (Reiser & Dempsey, 2002). Learning occurs when instruction is received by the learner and processed for knowledge formation. Behaviorists, cognitivists, situated learners, and/or constructivist theorists all hold this as a key principle to learning. The significance of instruction and the learner interacting are key in any educational setting and the absence of this principle may negate the purpose of what is being taught (Bandura, 1971; Vygotsky, 1978).

Educators such as Martin Nystrand (1997) push this definition further by noting that learning may occur with instruction but quality learning is related to the quality of instruction and of *classroom talk.* Instruction alone serves as a guide and does lead to learning as students listening to the instructor assimilate information. While learning occurs in traditional forums of learning (lectures or presentations), educators have realized that it could be enhanced (Reiser & Dempsey, 2002). Instruction alone does lead to learning but the quality, level, and effectiveness of learning may need more than instruction with interaction being a vital process of learning (Tu, 2000, as cited in Driscoll, & Carliner, 2005).

Traditional classrooms are well known to cover course content using methods of instruction that indirectly or directly reflect the idea that social learning or interaction is integral to the learning process. Many courses and educators often use learner examples to tie the complexity of an idea to real life experiences. Learners are often required to accomplish a task in groups, requiring interaction with peers and/or the environment (Palloff & Pratt, 1999). Such a process or method demonstrates the social context

(working with each other) and collaborative aspect (groups) used either by design or by default. Such a process can be observed and assessed in the traditional setting but is harder to detect or observe in distance learning courses.

This depicts the idea of interaction occurring naturally in face-to-face settings, but in distance learning, instructional designers and educators face limitations to interaction and therefore must address the social learning aspect in course design and instruction (Childers & Berner, 2000). They must do so because technologies have/are/will become a functional part of communities with learners communicate using a wide array of tools. While some tend to use traditional cell phones for student-teacher communication, others have immersed themselves in virtual communities complete with creating their own identity and community. With a personal image and personal webpage, they roam around in the virtual world visiting online communities searching for friends, peers, co-workers, things to shop, things to buy, and of course, sources of information. The information in the online world is far greater and is accessible to such an extent that educators at times have found it detrimental (Smaldino, Lowther, & Russell, 2008).

In the virtual environment, learners can find themselves immersed in the various forms of online learning (e.g., WebCT, Blackboard, Rosetta) and learning then is occurring within an environment that is unlimited in resources (Wilson, 1996). In such a conglomerated environment, learning must be carefully crafted by the educator so that it is possible to maximize the benefits and minimize the detriments of the virtual world. Social learning or collaborative efforts seem to achieve the equilibrium in the sense that by working with each other, learners are able to sift through information and achieve the necessary learning goals without risking learning the wrong material (Wells, 1999).

If social learning and constructivist theorists are correct that individuals learn by observing others, interacting and collaborating with their environment, then educators must be prepared and understand that collaborative efforts by learners are effective. It is critical that educators go into online or distance education understanding the implications that come in the absence of face-to-face interaction and collaboration (Tu, 2002). The growing number of virtual universities, traditional universities offering courses of programs via distance learning, and learning occurring using various computer platforms and applications highlight the importance of designing distance learning courses and programs to encompass the social interaction that is prevalent in face-to-face learning.

Distance Education and Interaction

The continuous shift towards distance learning highlights how necessary it is for educators and instructional designers to garner the strengths of interaction or collaboration to not only ensure learning is occurring but also that it is in-depth, structured, and effective (Wells, 1999). In many other ways, ensuring that interaction is present re-emphasizes the concept of socializing. The process allows norms and ideas to be maintained and enables the society's continuous learning and growth (Mercer, 2000). Enabling interaction within the classroom allows learners to work with others in the online environment and allows for the building of social communication norms, albeit in a digital world.

While distance educators and designers strive to facilitate online learning, researchers study the growing demand and use of distance learning and analyze how the virtual world is impacting our socio-cultural construction of knowledge (McIsaac & Gunawardena, 1996). Their findings only confirm concerns for inclusive social,

collaborative learning aspects to distance learning. Researchers conclude that if virtual communities are to resemble those that we live in today, distance education must provide the means.

Researchers are not the only ones bringing attention to the problems in distance learning. Some educators have always stressed technologies have limitations when it comes to the exchange of ideas (Gagne, 1974), impacting the quality of instruction and learning. The inability to interact with each other in real time and face-to-face means that students lose much communication and technology's inability to provide that real time interaction means that distance learning may not be as effective (Holmberg, 1989). Over time, distance learning educators have experimented with techniques given these shortcomings, determining that a collaborative form of learning was most effective (Tu, 2004).

The most widely used form of collaborative learning in classrooms, group work or projects, has been incorporated into online learning using various techniques adapted by educators. The use of postings and elaborate group projects (Driscoll & Carliner, 2005) may be costly and time consuming up front, but once designed, can best use the available technologies. Students can then independently research and collaboratively complete the project. Group activities give learners the flexibility to use technologies available to them individually, expanding on already available resources.

Research on distance education over the past decades has decidedly found several areas of emphasis. Aside from upgrades in technology and faster media, online communication and interaction was also identified as an important aspect of learners' motivation and presence in the educational process (Tu, 2004). Learners have also

demonstrated the value they have in the presence of informal interactions occurring before, during, and after formal classes. Much like traditional classroom settings, online learners have noted they prefer meeting in learning groups with or without the presence of the educator (Simonson et al., 2003).

Technology as a Facilitator

The long held notion about distance education is that it somehow undermines the quality and scope of learning; that technology and its availability, design, and limitations hamper valuable learning (Jonassen et al., 2003). Not too long ago major higher learning institutions preferred their traditional learning settings as they could not foresee the value they put on education being compromised by the confines of distance learning (Moore, 2001).

Educators and administrators alike saw the potential loss of the interpersonal dimension that face-to-face communication allows (Comeaux, 2002) as an impediment, and that content of lessons and courses may be missed, hindering learning. Asynchronous technology does limit both the dimensions and capacity of learning as they are not real time and there is delay between learner input and feedback. Real time learning has only been facilitated by synchronous technology within the last two decades, and with the rapid evolution of these tools now and in the future, distance education may increase in the capability to deliver real time learning (Comeaux, 2005).

There were numerous facts that contributed to the stigma distance learning had in the past relating to technology. For the most part, any distance learning that did occur in the past hindered communication, both in its verbal and nonverbal forms. Any type of interaction that occurred was often delayed, was one-way, and/or did not allow for

immediate feedback (Cuban, 2001). At times technology failed to support the type and amount of use and the system often timed out or froze. Learning had to be postponed. With the cost of technology stressing many institutions and learners alike, upgrades of purchasing newer technologies often took longer than necessary (Mash, Maranis, Van Der Walt, Van Deventer, Steyn, & Labadarios, 2006).

Technology in itself was not the only determinant to the level of learning. Often the level of learning and interaction was determined by the technology being used, the perceptions by the learner and educator, and the activities that were used to facilitate learning (Tu, 2004). An educator or learner who already had a negative perception of technology was often not open to teaching or learning. Course activities were often designed for traditional settings and did not take into account the complexities of the media (technology) that was being used.

In some cases, online instruction was designed to fit to the limitations of the available technology. The content focused on self-study lessons, alienating learners to learn on their own. Such an approach meant that the educators faced challenges in achieving their desired learning goals as they had to assist every learner on an individual basis. Educators embraced the technology but their approach of posting content for self-study lessons not only hindered interaction, but also did not assess if students were learning (Comeaux, 2002).

Today's educator may have access to a wide array of synchronous (simultaneous or real time) or asynchronous (not real time) technologies and most institutions are now equipped with broadband high speed Internet and/or wireless technologies (Reiser & Dempsey, 2002). Synchronous technologies can include two-way technologies that

enable interaction, live transmissions of audio and video, and computer-based or Internet-based interactive technologies such as conferencing or interactive relay chats. Asynchronous technologies can include one-way prerecorded video, one-way audio, or computer-based or Internet-based instruction in the form of learning software (i.e. Blackboard, Rosetta). The newest form of distance learning technology available to educators includes multi-mode packages that provide a combination of real time and not real time modes of instruction, greatly enhancing the capabilities of online education (U.S. Department of Education, 2009).

Technologies however are rapidly evolving, becoming affordable, and can meet the demands of the educational system. The much-valued non-verbal communication (i.e., tone of voice, eye, facial and body expressions) can now be included in video clippings, video streaming, and even live videos (Comeaux 2002; Mercer, 2000). Interactive audio/video distance learning networks such as the Iowa Communications Network (ICN) that once limited participation and that made students feel like *intruders in the classroom* are now using faster and more reliable technologies such as Adobe Connect (Comeaux, 2002; Rezabek, 1999).

The larger context depicts how technology use corresponds with the increase in distance learning courses. In the Department of Education's continuous assessment of distance education (U.S. Department of Education, 2003, 2009) there is a decrease in the use of asynchronous (not real time) Internet-based technologies from 90 percent in 2001-02 to 75 percent in 2006-07. This decrease in use of asynchronous technologies may mean educators and institutions have shifted to more real time technologies, increasing the ability to incorporate interactive activities.

Technologies tailored specifically to educational purposes have also been increasing and platforms such as Blackboard have provided for much that is considered distance learning. Although such applications have been known to have limited capacities for supporting interactive and collaborative activities, upgrades can make them more user friendly (Smaldino et al., 2008). Perhaps the largest change over time has been equipping campuses with the latest in broadband and Internet access technologies. The faster, more reliable technologies can enable the use of more interactive techniques to provide a student-centered alternative to the traditional settings (Comeaux, 2005).

Conclusively, there is no technology nor distance learning course that can provide the type of interaction occurring in face-to-face courses (Wilson, 1996). But with the constant improvement of technology and what it has to offer to the educational setting, instructional design is continually being adapted to take advantage of the new tools that facilitate the process (Simonson et al., 2002). Research shows courses designed and tailored to learner traits and based on a process, problem, or project have often been the most effective, simply due to the emphasis being on the development of knowledge. This means that in these types of courses, learners are able to build or construct their knowledge through active inquiry and social negotiation by collaborating with their peers (Jonassen et al., 2003).

Distance Education, Interaction, Technology, and the Learner

The definition of the distance learner has evolved over time and today's learner traits and learning styles differ from what was understood of them. Traditionally distance learners were atypical of the traditional face-to-face learner and had specific traits (Simonson et al., 2003). Distance learners were motivated, organized, and often initiated

their own learning. The majority of them often tended to be older or atypical of a college student (Rezabek, 1999). The courses they enrolled in were available through the Continuing Education department of their respective higher learning institutions.

These learners were also shown as autonomous and particularly attracted to the methods of distance learning (Holmberg, 1989). Most tended to be graduate level students and so distance learning courses were designed specifically for learners who were unable to attend campus courses and were intrinsically motivated to learn on their own. Consequently, the courses that were designed often tended to focus more on content and less on interaction (Rezabek, 1999). Even though technologies had enabled educators and learners alike, distance learning courses designed during the early years, when personal computers were being introduced for classroom use, rarely reflected any type of collaborative activities that would require learners to interact with each other and largely depended on self-development (Duffy & Jonassen, 1992).

Had the type of learners participating in distance learning remained self learners, there would be no need to change the design of courses, as they were succinctly tailored for the right audience. However since more educational institutions are pushing forward in their quest to provide more and more of their curricula via distance learners learning, it is inevitable that instructional design must change in order to cater to the wider audience, varying types of learners, and online environment (Reiser & Dempsey, 2002).

Recent studies have discovered that while there may be some remnant of correlations between distance learning and learners choosing this method of education, there appears to be no significant connection between the learner comfort in using technology and learner success in online courses (DeTure, 2004). Such studies help

address the stigma often associated with distance learning and notions that some learners were better suited for distance learning. While the stigma may not be present, there are differences in learners and so distance course design needs to address learner traits even more so than the traditional setting (Gibson, 1998).

With the learner in mind, educators and instructional designers alike must consider what works in traditional classroom settings, how interaction occurs, and how to use the available technologies to achieve the terminal goal: learning. Simonson and his peers (2003) document that distance learning must provide venues for learners to interact, informally, at all stages of learning. That means distance learning courses must be designed so that engaged learners are able to interact not only in the classroom setting but both prior and after the formal learning. Although tools such as a chat room are enabled within educational software such as Blackboard, chat rooms are rarely used independently by the students because they have not been used or incorporated into the course (Driscoll & Carliner, 2005).

Inevitably any study, in any country, regarding distance learning has repeatedly shown that interaction was a factor. Examples such as the case of medical students at the Stellenbasch University in South Africa depict the common theme: Interaction was seen as a factor in motivating students, providing moral support, encouraging exchange of ideas, providing opportunities to learn from each other, and providing a benchmark for students to determine their knowledge and learning (Mash et al., 2006).

Learner satisfaction is also associated with technology and how it serves the learning process (Tu, 2002). Whether the technology is a detriment or a facilitator of learning, however, largely depends on how it was incorporated into the course design,

and how much planning was put into the level and quality of interaction. This means that interaction can be simply limited to the learner and content or can be as complex as involving the educator, peers, materials and resources (Mash et al., 2006). Educators and instructional designers alike have been innovative in addressing such issues and examples abound depicting vibrant courses with plenty of learning occurring through the interaction (Conrad & Donaldson, 2004).

Since distance learners can no longer be grouped and don't necessarily share similar traits, it has forced educators to adapt their instruction. The most successful have been those who have moved from a teacher-centered, test-based, outcome-based approach to a student-centered, process-based, problem-based, or project-based approach (Jonassen et al., 2003). Such approaches ensure online course content and instruction consider not only the content that is being delivered, but also the context (virtual learning community), the learners and their traits or preferences for learning, and constraints such technologies (Driscoll & Carliner, 2005).

Success for most teachers is realized when students are encouraged to actively pursue self-directed learning (Comeaux, 2005). Courses that are designed and tailored to learner traits, and are based on process-, problem-, or project-based learning often have been the most effective simply due to the emphasis being on the development of knowledge. This means that in these types of courses, learners are able to build or construct their knowledge through active inquiry and social negotiation by collaborating with their peers (Jonassen et al., 2003).

The simple design of course content which is inclusive of collaborative and social activities can facilitate interaction within the learning environment (Comeaux, 2002).

Instructors and designers alike must define the roles of the instructor, learner, and classroom (Dick & Carey, 1996). Defining roles helps all parties involved to understand their expectations. For instructors, course design and activities need to result in engaged learning and so the role of instructor must be one that promotes such interaction and engagement (Kearsley, 2000). Learners, on the other hand, need to use their navigational skills in surfing the online world and become active in building on their knowledge (Conrad & Donaldson, 2004; Duffy & Jonassen, 1992). Classroom environments also must be designed to promote interactivity. This can be achieved through the use of technology by the instructor and course design to promote the use of already available/used technology (Moore, 2001).

Conrad and Donaldson (2004), Palloff and Pratt (1999), and Tu (2004) stress that the success of distance learning occurs when the learners are given opportunities, by the instructor and course requirements, to actively seek information while interacting with their peers. The challenge then for educators is to realize the pitfalls and accept the challenge of designing effective courses that enable all involved in the learning to innovatively use the technologies available and adapt to its shortcomings. The literature reviewed has discussed the pitfalls in distance learning that may lead to promoting the misconceptions that distance learning is less effective than face-to-face. Ensuring online courses are designed with creating activities that engage and challenge learners and promotes interaction can actually enhance the knowledge building, that is, learning (Conrad & Donaldson, 2004).

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Stressing communication and thereby interaction is not new by any means. Even in the early 1970s when the computers took up the size of a room and could only be used with punch cards, educational psychologists like Gagne (1974) already identified limitations of technology that are still prevalent in today's advanced technologies. Gagne's concerns centered on technologies having the ability to enable educators to provide feedback affecting instruction and learning, but he also envisioned advances in technologies that could someday negate such a problem.

Studies conducted over the years since Gagne's early assessment determined clear correlations between the success of courses and approaches favoring student independence (Holmberg, 1989), collaborative activities (Jonassen et al., 2003) and engaging (Driscoll & Carliner, 2005) learning. They stressed that distance learning would be more successful if educators "consistently present a communication process felt to have the character of a conversation" (Holmberg 1989 p.18), alluding to social learning.

Research continues to explore the relationship between the technological advances and media and the how it relates to our socio-cultural construction of knowledge (McIsaac & Gunawardena, 1996). This is important as more time is being spent in online environments by society.

Both effective educators and instructional designers support using collaborative learning as it has shown to contribute to higher achievement levels (Tu, 2002). Other theories or approaches to learning may be just as effective as collaboration but collaborative learning may suit distance learning as the type of learning is enhanced by

learners being able to work together with unlimited resources. Collaboration also brings learners together to have more frequent generation of ideas and solutions and in the process they have higher reasoning levels as they are able to decide collaboratively on what to learn (Comeaux, 2002).

The learning experience is greatly enhanced in collaborative environments as learners interact with peers and gather knowledge from each other. This learning is more effective than individualized or competitive learning as it is a compilation of ideas, an environment where learners attach greater value to their learning as they are contributors or part of the process.

More recent studies also negate the long held notion that distance learning is suited best for specific learners. Cognitive styles or the variation in learning styles are poor indicators of successful learning. Learner comfort with technologies also plays no significant factor in the overall learning process (DeTure, 2004). This is pertinent for today's educators and instructional designers because it indicates that technologies are becoming less of a burden on learning.

It is vital for those educators and learning institutions seeking to engage in distance teaching to understand the learners, technological advances, and best methods to achieve learning in online environments. Too often courses that were once taught in face-to-face environments are being offered in distance learning environments without the proper design or considerations of the online learning environment. Driscoll and Carliner (2005) suggest that simple modifications to curricula can achieve the higher levels of learning desired without spending the effort and time needed to design truly interactive courses. However for those wishing to spend the time and effort, they provide a problem-

based approach to the design of online course content and instruction that takes into consideration learning content, learning context, intended learners, and constraints (Driscoll & Carliner, 2005).

Recommendations

The technologies primarily being used to facilitate distance learning today may not necessarily be those being used tomorrow. Currently the majority of institutions use asynchronous technologies geared to providing content for learners, and are not necessarily designed as real time interactive environments. Asynchronous technologies such as WebCT, and Blackboard provide for content for K-12 and higher learning institutions alike (Mash et al., 2006).

The few technologies that are available that provide for real time interaction include dedicated broadband networks such as the Iowa Communications Network (ICN) which provide for real time voice and video feeds that enable virtual classrooms at multiple locations. Such networks however have largely been limiting with key concerns centering on the inability to actually be interactive, as the technologies often are slower and upgrades are often too costly (Rezabek, 1999). Hybrid courses are also being developed with a mixture of online applications and either face-to-face interaction and/or interaction thru various modes of videoconferencing (U.S. Department of Education, 2009).

Using the current technologies and forms of distance learning, courses are now being taught without the limitations of location or borders. Collaboration is occurring not only amongst learners, but also between institutions whereby institutions share their work and/or collaborate on projects. Examples abound of environmental educators in four

universities working together and combining resources (Comeaux 2002) or medical students in Stellenbosch University in South Africa being able to see a live video transmission of surgical procedures in the United States (Mash et al., 2006).

Indeed, online interaction is becoming the norm in society, let alone the educational field. Workers telecommute to work every day, house parents shop and share tips, and a large segment of society is involved in some form of social online network, be it FLIKR, TWITR, Facebook and Hi5, to name a few.

Newer technologies mean even more socializing in virtual environments. The U.S. military has already been using Adobe Connect, a software package that combines a series of applications that were used separately. It combines a presentation package, much like PowerPoint, audio, visual, chat, download and upload capabilities all in one. This means the user, or learner in the context of education, has multiple avenues of engagement. While listening to a presentation, he or she is able to chat with peers about the topic and share resources.

Such advancements in technologies will continue and this author envisions a day when wireless technology will also be a part of education. Much like professionals of today who are able to videoconference, email, text, and call all on one wireless device, tomorrow's learners will be able to attend classes virtually, and be able to achieve the higher levels of learning by interacting with the educator, their peers, and their environment, disregarding the constraints that often come when they are mobile. As forerunners in the use of distance learning, the U.S. military may indeed reflect educational institutions in the near future. And as learning shifts more and more to a

virtual world, we must understand the environment and translate seminal learning methods into this online world so that learning is not compromised.

It is for these reasons then, that educators and institutions must understand why the educational system must continuously strive to incorporate interactive and collaborative activities in learning. Further studies need to be conducted to research and to identify how learners have transitioned from traditional forms of knowledge building, i.e. interaction, to the virtual environment (Wells, 1999). Research also needs to focus on how construction of knowledge outside the educational field is/will occur in online environments. Lastly, recommended studies should focus on how society is being formed or transformed online and how the face-to-face community with all its social norms can be replaced in the online world.

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